Outreach Committee Project Proposal

Applicant	Jay Ryu
Applicant ID	APP-000348
Company Name	University of Idaho
Recipient Address	University of Idaho 1031 academic way Boise, ID
Email	jryu@uidaho.edu
Funding Requested	$0.00
Status	Submitted
Funded	

Contact

Question: Entity name

University of Idaho

Question: "Doing business as" (If applicable)

University of Idaho Boise

Question: Federal Tax ID Number

82-6000945

Question: Street address

322 E Front St

Question: PO Box (If applicable)

Not Answered

Question: City

Boise

Question: State

Id

Question: Zip Code

83702

Question: Entity website

www.facebook.com/idroneprogram

Question: Last name

Ryu

Question: First name

Jae

Question: Email address

jryu@uidaho.edu

Question: Contact phone

2083324402

Project Information

Question: Project title

iDrone Summer Camp 2020

Question: Project manager first name

Jae

Question: Project manager last name

Ryu

Project Description

Question: Project description

Unmanned aerial system (UAS, also known as drone) technologies will be a driving force for economic development in the coming decades. UAS technology is no longer military-centric business; its broad applications are also prevalent in many civil operations, including emergency response, hazard monitoring, delivery service, and public safety. Propelled in part by significant recent technology improvements in smartphones and various sensor devices, the UAS market in 2020 is increasing rapidly. However, domestic training and technology in the United States is not yet ready to be competitive in the global marketplace due to slow core technology development, limited expertise, and incomplete infrastructure. Additionally, US federal regulation and policy on UAS applications are not clearly developed. These deficiencies make it difficult for the public to fly UAS safely and legally. Through a drone training summer camp, therefore, we will educate and train students (6th – 12th grade students) across Idaho. Through this program, STEM students will become familiar with UAS technology so that they can be competitive in the future workforce.
If this idea is selected, the team will a 2-day, hands-on workshop at multiple cities, including Boise, Meridian/Nampa, and Twin Falls during this summer to stimulate Idaho youth by helping students experience drone building, coding, and safe flights in the national airspace. Events will occur under the supervision of Federal Aviation Administration (FAA)-certified pilot. During the workshop, local UAS professionals will be also invited to interact with students to brainstorm how the fast-moving drone technology can be used to solve real-world problems, including but not limited to rescue missions, delivery services, real estate, environmental monitoring, precision agriculture, and more. Since the team has experience running a similar program known as idaho summer camp 2019 (See the link at https://www.kivitv.com/news/university-of-idaho-hosts-summer-drone-camp-for-kids-in-boise). The proposed outreach activities can be easily achievable. Note that the registration page is filled up quickly within in 24 hours so that broad impact is large.

Question: Campaign timeline

A flyer will be circulated via the established STEM network and also posted on the team's facebook at www.facebook.com/idroneprogram as soon as the fund is granted. We are looking at 90 students, 6th – 12th grade, across Idaho. The iDrone summer camp 2020 will take place in Boise (U of I Boise), Meridian/Nampa (Vallivue Middle School), and Twin Falls (College of Southern Idaho) this summer. (The exact date will be determined upon funding) Project report along with student survey regarding the quality of the program will be available on time.

Organizational Capacity Resume

Question: Please attach an organizational resume that demonstrates your organization's capacity to complete this project.

UI-IDRONE2019-Flyer.pdf (2/25/2020 11:50 AM)

Question: Please attach a resume or bio for the named project person.

CV-Ryu20200108-Standard.pdf (2/25/2020 11:52 AM)

Budget

A project budget will need to be uploaded as part of the application process. Please click on the link to the Outreach Committee Project Proposal Budget. There will be an option to download the budget template. Please complete the template and upload to the appropriate question in this section.

Budget Sheet

Question: Budget

Outreach Committee Project Proposal Budget Sheet.xlsx (2/25/2020 12:20 PM)

Question: Budget notes

The iDrone program provide $75,997 worth in-kind contribution

Outcomes

Question: Entity responsible for tracking and reporting

University of Idaho

Question: What is the potential for increasing the awareness of careers for Idahoans?

According to the Idaho State Board of Education, Idaho's high school go-on rate to college is one of the lowest in the nation and the rate continues to decrease. This has important ramifications for the increasingly important science and technology sectors of the U.S. economy. Developing a targeted intervention program is critical to encourage middle/high school students who have shown a tentative interest in STEM or college to enter the university for their STEM career. To promote STEM pipelines and increase go-on rates in Idaho, this hands-on STEM program is proposed.
The idea of the iDrone is built upon the previous pilot program known as "Idaho Drone League (iDrone)" funded by UI's President Office through Vandal Idea Project (VIP). More than 500 students across the state have been impacted by iDrone 2018 and 2019 and its extended activities, including iDrone 4-H and Engineering Expo. The goal of iDrone Institute continues to encourage Idaho Youth (6th – 12th Grade students) who are interested in STEM fields or college to enter the university for their STEM career across the state.

Question: What is the anticipated reach of the project?

The iDrone workshop took place successfully in three locations (Moscow, Boise, and Pocatello) across the state over the last two years 2018 and 2019. This program benefits more than 500 Idaho students directly and indirectly by offering the hands-on experience in the fast-moving technology and by learning basic concepts in automatic control, robotics, and programming during spring break 2018

(https://idahonews.com/features/stem-in-idaho/watchuofiprofessorteachesdrone101workshop) and 2019 iDrone Summer Camp (https://www.kivitv.com/news/university-of-idaho-hosts-summer-drone-camp-for-kids-in-boise). This workshop provided team-project opportunities to fuel a passion for education and an excitement in technology fields. Students overall reported a very high satisfaction with the workshop. Comments made by students include: “If you aren’t sure of what career you want to choose then definitely go to a STEM workshop (iDrone) and let your creative juices flow”, “We enjoyed having the hands-on experience that we can’t get anywhere else”, “STEM workshop is a great opportunity for those interested in learning more about their world and finding ways to improve it”, “Even if someone is not crazy about STEM, they will surely find something that would engage them”, and “I didn’t like STEM before this iDrone workshop”. With this joyful STEM principle in mind, we keep looking for additional funding to offer the iDrone workshop to benefit more young Idahoans in other locations by reaching out, not limited to Coeur d’Alene, Hailey, Idaho Falls etc when additional funding is available. The iDrone will take an advantage of land grant mission by considering whole state of Idaho our campus. For the long-run, we will host an annual regional and state-wide meetings by inviting iDrone alumni across the state, while on-site workshop at an individual school will be offered upon request by local educators.

Question: What are the anticipated project outcomes?

The outcome of this project funded by IWDC grant developed is a STEM education curriculum to introduce Idaho youth (6th - 12th grade students) to drones through building/flying them and conducting research as a way to increase their likelihood to enroll in STEM college majors after high school. Additionally, the evaluation will further inform how the program impacts on STEM communities in Idaho and beyond and can be used to establish an Idaho-wide drone league with annual meetings in years to come.

Question: What metrics and or reports will be delivered to the committee, and when?

Once funded, the team will go through the approval process for humans in research by submitting the respective paperwork to the UI Institutional Research Board (IRB). Thus, college-readiness and college identity survey (pre- and post-test) will take place during workshop and compare with post-secondary enrollment data from National Student Clearinghouse to measure increased likelihood of enrolling in college within one year of high school graduation (Go On Rate), especially enrollment to Idaho's public universities (e.g., University of Idaho, Boise State University , and Idaho State University). A STEM identify survey will be also carried out to evaluate the increased likelihood of choosing STEM as a career, while the pre- and post-test assessing academic learning in the three dimensions of the next generation science standard is being proceeded to achieve the goal of this project. We will make a final report along with the survey result to the committee within 90 days upon the completion of the proposed camp.

iDRONE

2019 SUMMER CAMP

UNIVERSITY OF IDAHO BOISE

JUNE 6-7, 2019 • FREE

ATTENTION 6TH - 11TH GRADE STUDENTS,

Come pilot drones for fun & research!

Drones, also known as UAVs (Unmanned Aerial Vehicles), are a new form of entertainment and also used extensively for research and work projects.

In this two-day camp you will learn the basic DOs and DON'Ts of drone flying, how to build a drone, program with code, and practice the basics of flying a drone.

This class is free and open to grades 6-11.

- Build and fly UAVs | Learn with new friends | Epic STEM experience!
- See Idaho from a drone's eye view
- Find solutions to problems
- Understand regulations

Presented by the University of Idaho College of Agriculture and Life Sciences

REGISTER TODAY AT

BIT.LY/IDRONE2019 »

Registration is open until March 26, 2019

Questions?

Jae Ryu • U of I Boise • **jryu@uidaho.edu**

CAMPUS MAP AT:

BIT.LY/UIBOISE »

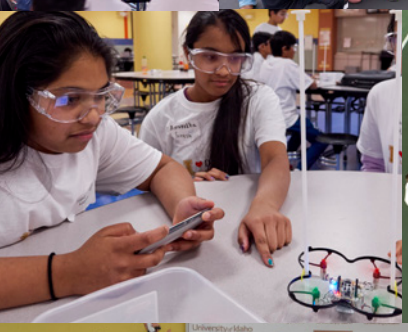
WELCOME STUDENTS!

Join us for a gathering of students, experts and researchers interested in Unmanned Aerial Vehicles (UAVs) also known as Drones.

Have a great time with new friends, learn to build and fly drones, and gain experience in Science, Tech, Engineering, and Math.







MEET JAE RYU, YOUR UI CALS PROFESSOR

Contact him at jryu@uidaho.edu

iDRONE CAMP SCHEDULE:

DAY ONE

9:00a – 10:00a	WELCOME! Meet the Experts: Real world drone professionals share their craft
10:00a – 2:00p	Breakout Sessions • FLIGHT STATION: Fly tiny drones in simulated scenarios • RESEARCH DRONES: Learn how drones are used in research • POSTER CHALLENGE: Make a poster spotlighting sci-fi & future drone applications
12:00p – 1:00p	Lunch, Rules & Regulations: Find out what you need to fly by the rules
1:00p – 2:00p	Breakout Sessions: FLIGHT, RESEARCH, POSTER
2:00p – 4:00p	BUILD YOUR DRONE! Use a kit to build, program with code, and fly your own UAV
4:00p – 5:00p	Flex time: BUILD, FLIGHT, POSTERS, EXPERTS
5:00p	Dismiss • *The detailed schedule is subject to change without prior notice* • **Unscheduled breaks throughout Day One & Two*

DAY TWO

9:00a – 9:30a	Morning Warm Up & Ice Breakers
9:30a – 10:30a	Breakout Sessions: FLIGHT, BUILD, POSTER
10:30a – 11:00a	Snacks with Experts
11:00a – 12:00p	Breakout Sessions: FLIGHT, BUILD, POSTER
12:00p – 1:00p	Lunch with Experts
1:00p – 2:00p	Breakout Sessions: FLIGHT, BUILD, POSTER
2:00p – 3:00p	Take a break, talk to experts. Field trip scheduled if the weather permits
3:00p – 5:00p	Poster Presentation and Good-Bye Social
5:00p	Dismiss

This event is sponsored by: Idaho State Board of Education

Hi Jae,

Just to be crystal clear this grant is to support 90 Treasure Valley Kids participating in the camp?
Total 90 students.
30 students from Boise areas
30 students from Meridian/Nama area
30 students from Twin Falls area.

I would like to benefit more Idaho youth across the state for broad impact.

Would you be able to quickly provide me:

- A quick paragraph regarding your financial need including where else you have sought funding
    - and why U of I is unable to fund

UI has supported iDrone camp over the past 2 years, but UI is currently suffering from budget cut as you may know of. All three public universities (UI, BSU, ISU) are the same, I guess. Many faculty and staff at UI are in furlough. Now, my iDrone program is trying to secure funding from external sources like Idaho Workforce Development Council so that participating students won't cost anything. Basically, it is FREE camp for Idaho youth.

- A list of partners

College of Southern Idaho (Twin Falls workshop)
Vallivue Middle School (Meridian/Nampa idrone)
University of Idaho Boise (Boise workshop)

Let me know if you need further clarification.
Jae
Hope this works.

Jae

Outreach Committee Project Proposal Budget

Description	Amount/Value	Source
Personnel: The iDrone Team, staff, 2 FAA-certified pilots, visual observers	$24,000	IWDC Outreach
Fringe Benefit 30.9%	$7,200.00	IWDC Outreach
Travel: $0.56/mile, 4 staff, lodging $100/night, 4 nights, per diem $45/day	$8,795	IWDC Outreach
Supplies: iDrone development kit $250/unit * 90 students= $22,500, tools and camera sensors ($3,500)	$26,000	IWDC Outreach
Supplies: Demonstration research drone $4,999, 3 drones; demonstration hyperspectral sensor $45,000, outdoor drone flight $2,000 * 3 units	$ 75,997.00	UI iDrone Program
Participant support cost: Meals $15.75/lunch/participant, 90 participants/workshop, 3 workshops; camp insurance $0.30 each, 90 participants, 2 days, 3 workshops	$ 4,414.50	
	$146,407	

PLEASE COMPELTE

Totals	
In-Kind	$ 75,997.00
Match	
Grant Request	$ 70,409.50
Total Project budget	$ 146,406.50

Jae Ryu, Ph.D., P.E.

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January 7, 2020

EDUCATION

Doctor of Philosophy in Civil and Environmental Engineering, 2006
University of Washington, Seattle, WA, USA
Dissertation: The management of water resources using a mid-range climate forecast model
Advisor: Richard N. Palmer (Supervisor), Stephen J. Burges

Master of Science in Civil and Environmental Engineering, 2001
University of Washington, Seattle, WA, USA

Bachelor of Science in Agricultural Engineering, 1996
Konkuk University, Seoul, Republic of Korea

HONORS AND AWARDS

2017: Vandal Idea Project (VIP) Award, Idaho Drone League (iDrone)
2017: Brain Pool Fellow, National Research Foundation
2017: Lawrence Berkeley Faculty Fellow, Department of Energy
2015-2016: US Air Force Faculty Fellow, Department of Defense
2012: UI Young Investigator Award for climate change adaptation in Idaho, UI

PROFESSIONAL LICENSES

Professional Engineer, Water Resources Engineer since 2004
The State of Washington, Registration No. 41416
The State of Nebraska, Registration No. E-12894 since 2009
The State of Idaho, Registration No. 15009 since 2012

PROFESSIONAL APPOINTMENT

4/2016 – present **College of Agriculture and Life Sciences, University of Idaho, USA**
Associate Professor, Water Resources Program/Soil and Water Systems Department
Current appointment: 80% research and 20% scholarly service

1/2010 – 7/2016 **College of Agriculture and Life Sciences, University of Idaho, USA**
Assistant Professor, Dept. of Bio & Agricultural Engineering
Current appointment: 80% research and 20% scholarly service

- Hydrological modeling for drought impact assessment
- Climate impact mitigation and adaptation
- Sustainable water resources planning

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- Conflict resolution model

5/2015 – **Department of Electrical and Computer Engineering, US Air Force Academy, USA**
7/2016 *Air Force Faculty Fellow*, Academy Center for Unmanned Aircraft Systems (UAS)

- UAS-based drought monitoring system
- Drought index development
- Hyperspectral imaging processes

5/2006 – **School of Natural Resources, University of Nebraska-Lincoln, USA**
12/2009 *Hydrologist (Postdoctoral Research Associate)*, National Drought Mitigation Center
Current appointment: 70% research and 30% scholarly service.

- Develop computer-based decision-support systems for drought management
- Incorporate climate forecast information into hydrologic modeling
- Develop GIS-based web application for decision makers
- Write grant proposals and supervise graduate and undergraduate students.

PROFESSIONAL AND SCHOLARLY SERVICE

1. American Society of Agricultural and Biological Engineers, Member, 2010- present
2. American Society of Civil Engineers, Committee, 2002-present, Environmental Water Resources System, World Environmental & Water Resources Congress
3. American Society of Civil Engineers, Committee, 2010-present, International Water Council, World Environmental & Water Resources Congress
4. American Water Resources Association (2002-Present), AWRA 2014 Summer Specialty Conference on IWRM Planning Committee, Chaired, Risk perception and community vulnerability, AWRA 2011 Spring Specialty Conference, Baltimore, April 18-19, MD
5. American Geophysics Union (2002-Present)
6. Korea Institute of Construction Technology (KICT), Technical Advisory Board-Water Resources, 2010-present
7. Korean-American Scientists and Engineers Association (KSEA), UKC 2016, Executive Director, KSEA 45 Admin Executive Director, President of KSEA Boise Idaho Chapter (2011-present, 41-42nd admin)
8. Associate Editor, Journal of Civil Engineering, Korean Society of Civil Engineers (2013-present)
9. Agriculture, Environment and Society (POD) Program of Distinction (POD), CALS
10. Department Promotion and Tenure Committee for Marvin Heimgartner, 2011, BAE, University of Idaho
11. Eastern Snake Hydrologic Modeling Committee (ESHMC), Idaho Department of Water Resources (2012-present)

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12. Maquis Who's Who in America 2015 (69th Edition)

TEACHING ACCOMPLISHMENTS

Courses Taught: Hydrological Modeling and Application, WR504 (2.4 CEUs, 2 Credits), University of Idaho, Summer, 2019
Courses Taught: System dynamics for water resources, University of Idaho, Summer, 2018
SOIL 001: System modeling for water resources management (2.4 CEUs)
SOIL 404: System modeling for water resources management (2 Credits)

Student Advised (and Serving): Water Resources Engineering (as major professor)
Jung Jin Kim, Ph.D. Student, 2011-2017 (Currently Post-Doc at Texas A&M University)
David Hoekema, Ph.D. Student, since Fall Semester 2011
Logan Miller, M.S. Student, since Fall Semester 2012
Riveraine Walter, Ph.D. Student, since Fall Semester 2014
Caitlin Eastman, Ph.D. Student, since Fall Semester 2015

Graduate Committee Served (and Serving) on:
Arpana Nayak, ME student, 2014-2015
Mohammad Sohrabi, Ph.D. Student, since Fall Semester 2010
Jacob Wolf, M.S. Department of Geography, 2012
Mark Cecchini Beaver, College of Law, 2010-2011

Postdoctoral Research Associate Advising and Mentoring:
Jinwon Seo, Ph.D., 2011-2012, currently at a state agency
Anil Acharya, Ph.D., 2011-2012, currently Assistant Professor at Alabama A&M University

Graduate Students Oversea:
Christabel Jane Rubio, M.S. in Civil Engineering at Kongju National University, 2010

PEER-REVIEWED JOURNAL PAPER

*# Indicates a graduate student and postdoc co-author, respectively

1. Neufeld, J., Ryu, J., Barbour, J. 2020. "Development of UAV-based insect scouting method", Journal of Extension (accepted)

2. Ryu, J.H. and *Kim, J.J. 2019. "A study on climate-driven flash flood risks in the Boise River Watershed, Idaho", Water 11(1039), 1-17

3. *Kim, J.J. and Ryu, J.H. 2019. "Quantifying the performances of the semi-distributed hydrologic model in parallel computing – a case study", Water, 11(823), 1-19

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4. Ryu, J.H., *Jungjin Kim., Kyungdo Lee., 2019. "Development of hydroclimate drought index (HCDI) for effective local drought analysis in Korea., Journal of Korean Society of Agricultural Engineers, 61(1), 31-44

5. *Kim, J. and Ryu, J.H., 2019. "Modeling hydrological and environmental consequences of climate change and urbanization in the Boise River Watershed." Journal of the American Water Resources Association, 55(1), 133-153

6. Hoekema, D., Ryu, J. H., 2016. "Characterizing Drought in Irrigated Agricultural Systems: The Surface Water Delivery Index (SWDI)", Journal of the American Water Resources Association, 52(3), 737-755

7.*Kim, J.J., Ryu, J.H. 2016. "A Heuristic Gap Filling Method for Daily Precipitation Series", Water Resources Management, 30(7), 2275-2294

8.*Sohrabi, M., Ryu, J. H., Abatzoglou, J., Tracy, J., 2016. "Closure to Discussion: Development of Soil Moisture Drought Index (SODI) to Characterize Hydrological Drought by Mohammad M. Sohrabi, Jae H. Ryu, John Abatzoglou and John Tracy, DOI:10.1061/(ASCE)HE.1943-5584.0001213, 21(4), 07016002-1

9.*Sohrabi, M., Ryu, J. H., Abatzoglou, J., Tracy, J., 2015. "Development of Soil Moisture Drought Index (SODI) to Characterize Hydrological Drought", Journal of Hydrological Engineering, 20(11), 0415025(1-15)

10. *Kim, J.J., Ryu, J.H. 2015. "Quantifying a threshold of missing values for gap filling processes in daily precipitation series", Water Resources Management, 29(11),4173-4184

11. Ryu, J. H., *Sohrabi, M., #Acharya, A. 2014. "Toward mapping gridded drought indices to evaluate local drought in a rapidly changing global environment", Water Resources Management, 28(11), 3859-3869

12. *Kim, J. J., Ryu, J. H., 2014. "A threshold of basin discretization levels for HSPF simulations with NEXRAD inputs", Journal of Hydrological Engineering, 19(7), 1401-1412

13. #Acharya A., Ryu, J. H. 2014. "Simple method for streamflow disaggregation", Journal of Hydrological Engineering, 19(3), 509-519

14. *Sohrabi, M., Ryu, J. H., Alijani, B., 2013. "Spatial and temporal analysis of climatic extremes over the mountainous region of Iran", The International Journal of Climate Change: Impacts and Responses, 4(4), 19-37

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15. *Hoekema, D., Ryu, J. H., 2013. "Evaluating Economic Impacts of Water Conservation and Hydrological Forecasts in the Salmon Tract, Southern Idaho", Transaction of the ASABE, 56(4), 1-12

16. *Sohrabi, M., Ryu, J H.., Abatzoglou, J., Tracy, J. 2013. "Climate extreme and its linkage to regional drought over Idaho, USA", Natural Hazards, 65:653-681

17. Ryu, J H.., Contor, B., Johnson, G., Allen, R., Tracy, J. 2012. "System Dynamics to Sustainable Water Resources Management in the Eastern Snake Plain Aquifer under Water Supply Uncertainty", Journal of the American Water Resources Association, 48(6), 1204-1220

18. Smith, M.B., Koren, V., Zhang, Z., Zhang, Y., Reed, S.M., Cui, Z., Moreda, F., Cosgrove, B.A., Mizukami, N., Anderson, E.A., DMIP 2 Participants (Ryu, J.H.), 2012. "Results of the DMIP 2 Oklahoma experiments", Journal of Hydrology, 418-419, 17-48

19. Ryu, J.H., Jeong, S., Park, S.K., Lee, J., Han, K., 2011. "The impacts of climate change on the local hydrology and drought (low flow) frequency", Hydrological Processes, 25(22), 3437-3447

20. Ryu, J.H., Svoboda, M.D., Lenters, J.D., Tadesse, T., Knutson, C. 2010. "Finding Potential Extents for ENSO-Driven Hydrologic Drought Forecasts in the United States", Climatic Change, 101(3),575-597

21. Ryu, J.H., 2009. "The application of HSPF to Distributed Model Intercomparison Project (DMIP): Case Study", ASCE Journal of Hydrologic Engineering, 14(8), 847-857

22. Ryu, J.H., Palmer, R.N., Jeong, S., Lee, J., Kim, Y.-O., 2009. "Sustainable Water Resources Management in the Conflict Resolution Framework", Journal of the American Water Resources Association, 45(2), 485-499

23. Ryu, J.H., Palmer, R.N., Wiley, M.W., Jeong, S., 2009. "Mid-Range Streamflow Forecasts Based on Climate Modeling-Statistical Correction and Evaluation", Journal of the American Water Resources Association, 45(2),355-368

24. Jeong, S., Lee, J., Ryu, J.H., Palmer, R.N., 2004. "An Application and Development of Drought Management System for Guem River Basin", Journal of the Korean Society of Civil Engineers, 24(3B), 201-208, 2004

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25. Jeong, S., Ryu, J.H., Lee, J., Palmer, R.N., 2003. "Development of Shared Vision Model for Optimal Water Supply for Kum River Basin", Journal of the Korean Society of Civil Engineers, 23(3B), 191-199, 2003

CONFERENCES/PRESENTATIONS

1. Ryu, J.H., 2019. "Idaho Drone League (iDrone) and Water Resources Research Applications, AWRA Annual Meeting, American Water Resources Association, Salt Lake City, November 2-5

2. Ryu, J.H., 2019. "Development of low-cost autonomous air quality sensing for public health", UKC 2019 Annual Meeting, Chicago, August 14-17

3. Promoting K-12 education in water resources using unmanned aerial system: Idaho Drone League (iDrone 2018), AWRA Annual Meeting, American Water Resources Association, Baltimore, November 4-8, 2018

4. UAS applications to advance drought monitoring and water management, UKC 2018 Annual Meeting, New York City, August 1-4, 2018

5. National research and development initiative to mitigate drought impacts in a changing global environment, National Assembly, Seoul, Korea, May 11, 2018

6. UAS application to advance water quality monitoring in the Lower Boise River Watershed, Natural Resource Conservation Services (NRCS), Caldwell, Idaho, May 8, 2918

7. Urbanization impact on water quality and quantity in the Boise River Watershed, Idaho Department of Water Resources, Boise, Idaho. February 5, 2018

8. Agricultural water management and farmland inundation forecast service using Unmanned Aerial Vehicle (UAV), KSEA 2017 Fall Meeting, Jeju Island, South Korea, October 15, 2017

9. (Invited)Applications of Unmanned Aircraft System (UAS) for Western Water Research and Environmental Studies, UKC 2017 Annual Meeting, August 9-13, 2017, Washington DC., USA. August 9-13, 2017

10. Advancing drought monitoring using a small Unmanned Aircraft System (sUAS) for irrigated agriculture: Challenge and Opportunities, 2017 World Environmental and Water Resources Congress, Sacramento, California, May 21-25, 2017

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11. (Invited) Integrated system-wide climate-food-water nexus (ICFEWS) modeling in a changing environment: challenges, alternatives, and policy making, Tri-State INFEWS workshop, Coeur d'Alene, Idaho, April 10, 2017

12. Advancing drought monitoring using a small Unmanned Aerial System (UAS) for irrigated agriculture, Climate Impacts to Water Skamania Lodge, Northwest Water Conference 2017, Stevenson, Washington, January 27, 2017

13. Advancing drought monitoring and outlook to promote adaptation and community resilience in a changing climate, AMS 2017 Annual Conference, Seattle, Washington, January 23, 2017

14. Advancing drought monitoring using a small unmanned aerial system for conjunctive water management in a changing climate, AGU 2016 Fall Meeting, San Francisco, California. December 12-16, 2016

15. (Invited) Characterizing mega drought using bigdata to improve data-intensive water management decisions in a changing climate", Lawrence Berkeley National Laboratory, Berkeley, California. December 6-7, 2016

16. Advancing drought monitoring and outlook for sustainable water resources management in a changing climate, AWRA 2016 Annual Conference, Orlando, Florida. November 13-17, 2016.

17. Advancing drought monitoring and outlook for sustainable water resources management in a changing climate", Department of Geography, University of Idaho, Moscow, Idaho, February 17, 2016.

18. Climate-Driven Drought Outlooks in the Pacific Northwest and Water Resources Management Challenges and Opportunities, Pacific Northwest Clean Water Association (PNCWA), Annual Conference & Exhibition, Boise Centre, Boise, Idaho. October 25-28, 2015

19. Water Resources Planning and Management to Mitigate Drought in a Changing Climate: Monitoring, Management, and Outlooks, The 1st Climate Change Symposium: Adaptation and Mitigation, Hilton Garden Inn, Chicago, Illinois. May 3-5, 2015.

20. Impact Assessment of Urbanization and Land Use Change Using LID to Characterize Water Quality in the Boise River", 2015 Water Quality Workshop: Monitoring, Assessment, and Management, Boise State University, Boise, Idaho, February 3-5, 2015

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21. Hydro and Environmental Impact Mitigation for the Boise River Watershed, Idaho: Modeling and Alternatives Using LID. 2014 AWRA Annual Conference, Sheraton Premiere Hotel, Tysons Corner, Virginia. November 3-6, 2014

22. (Invited) Spatial and temporal analysis of hydrologic response for land use change at Kyoung-An stream watershed, UKC 2014: Forward Together, US-Korea Conference, Hyatt Regency San Francisco Airport, San Francisco, California, August 6-9, 2014.

23. Water Resources Planning and Management to Mitigate Drought in a Changing Climate: Monitoring, Management, and Outlooks. 2014 ASABE/CSBE/SCGAB Annual International Meeting, Montreal, Quebec, Canada. July 13-16, 2014.

24. Hydrologic modeling and pollution control using LID to mitigate impacts of urbanization, 2014 AWRA Summer Specialty Conference, John Ascuaga's Nugget, Reno, Nevada. June 30 – July 2, 2014

25. Analysis of runoff characteristic and nonpoint source pollution for land use change at Kyoung-An stream watershed, South Korea, 2014 AWRA Summer Specialty Conference, John Ascuaga's Nugget, Reno, Nevada, June 30 – July 2, 2014

26. Evaluating Drought in Managed System: Matters of Water Supply and Demand, 2013 Annual Water Resources Conference, American Water Resources Association, Red Lion Hotel, Portland, Oregon. November 4-7, 2013.

27. Toward Visualizing Big Drought Data for Data-Intensive Decision Making, ASCE World Environmental and Water Resources Congress, Cincinnati, Ohio. May 19-23, 2013

28. Decision Support Tools for Conflict resolution and Sustainable Water Resources Planning and Management: After Pete's approach", ASCE World Environmental and Water Resources Congress, Cincinnati, Ohio, May 19-23, 2013.

29. Mapping Drought Vulnerability Driven by Future Climate Change and Variability in South Korea", ASCE World Environmental and Water Resources Congress, Cincinnati, Ohio. May 19-23, 2013.

30. Development of Multi Scalar-Soil Moisture Drought Index", ASCE World Environmental and Water Resources Congress, Cincinnati, Ohio. May 19-23, 2013.

31. Validating Local Droughts to Enhance Climate-Resilient Agricultural Water Management in Idaho", 2013 NSF EPSCoR Tri-State Meeting, University of Nevada at Las Vegas, Las Vegas, Nevada. March 27-28, 2013.

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32. Decision Support Tools for Drought Monitoring Management and Forecasting in the State of Idaho", 2012 Annual Water Resources Conference, American Water Resources Association, Hyatt Regency Jacksonville Riverfront, Jacksonville, Florida. November 12-15, 2012.

33. Toward Mapping Gridded Drought Indices to Mitigate Drought Impacts in a Rapid Changing Global Environment", 3rd Annual Pacific Northwest Climate Science Conference, Boise Centre, Boise, Idaho. October 1-2, 2012.

34. Development of Sustainable Water Resources System Against Uncertain Future Climate and Drought for the Seomjin River System, Korea. 18th Congress of the Asia and Pacific Division of the International Association for Hydro-Environment engineering and Research , Jeju Island, Korea. August 19-23, 2012.

35. Using Satellite Imagery to Estimate Aquifer Recharge from Irrigated Agriculture", ESRI International User Conference, San Diego, California. July 23-27, 2012.

36. A Decision Support Systems to Mitigate Water Conflicts amongst Agriculture, Hydro, and Municipal Water Users", Universities Council on Water Resources, Santa Fe, New Mexico. July 17-19, 2012.

37. Spatial and Temporal Analysis of Climatic Extremes in the Mountainous Regions of Iran, International Conference on Climate Change: Impacts and Responses, University of Washington, Seattle, Washington. July 12-13, 2012.

38. Calculator: Optimized Surface Water Allocation in Drought (OSWAD)", 93rd Annual Meeting of the AAAS Pacific Division, Boise Convention Center, Boise, Idaho. June 24-27, 2012.

39. Impacts of Climate Change on Hydrologic Drought in an Agriculture-dominated Watershed in the United States, ASCE World Environmental and Water Resources Congress, Albuquerque, New Mexico. May 20-24, 2012.

40. Investigating Economic Impacts of Agricultural Drought Using System Dynamics, ASCE World Environmental and Water Resources Congress, Albuquerque, New Mexico. May 20-24, 2012.

41. Drought Monitoring, Forecasting, and Management in the 21st Century: Issues and Challenges, ASCE World Environmental and Water Resources Congress, Albuquerque, New Mexico. May 20-24, 2012.

42. Investigating drought using extreme climatic indices over Idaho, USA, AGU Fall meeting, San Francisco, California. Dec 5-9, 2011.

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43. Application of System Dynamics to assess climate impacts on the Eastern Snake Plain Aquifer", Pacific Northwest Climate Science conference, Seattle, Washington, September 12-14, 2011.

44. Application of System Dynamics to Adaptive Management for the Eastern Snake Plain Aquifer", ASCE World Environmental and Water Resources Congress, Palm Springs, California. May 22-26, 2011.

45. System Dynamics for Climate-Driven Socioeconomic Water Issues", AWRA Summer Specialty Conference-Managing Climate Change Impacts on Water Resources: Adaptation Issues, Options, and Strategies, Sheraton Inner Harbor Hotel, Baltimore, Maryland. April 18-20, 2011.

46. Climate-Driven Water Budget Analysis in the Eastern Snake Plain Aquifer, AGU Fall meeting, San Francisco, California, Dec 13-17, 2010.

47. A framework of hydroclimate modeling and decision support tools for sustainable water resources planning in a changing climate", 2010 ASCE World Environmental and Water Resources Congress, Providence, Rhode Island. May 16-20, 2010

48. Hydrologic Drought in the Upper Nakdong River Basin", 2010 ASCE World Environmental and Water Resources Congress, Providence, Rhode Island. May 16-20, 2010.

49. Challenges and Issues in Collaborative Climate Change Research, the 2nd Annual Tri State Consortium Meeting, Hyatt Regency Lake Tahoe, Incline Village, Nevada. April 6-8, 2010.

50. Challenges and lessons learned from hydrologic simulations using HSPF and SWAT with NEXRAD rainfall inputs, 2009 AWRA Annual Conference, Seattle, Washington. November 9-12, 2009.

51. Application of SWAT to climate-driven low flow (drought) frequency analysis", 2009 5th International SWAT Conference, Boulder, Colorado. August 3-7, 2009.

52. A framework of sustainable water resources management in a changing climate", The Commission for Water Sustainability International Geographical Union (IGU), Torino, Italy. July 27-31, 2009.

53. Visualizing hydrologic drought information on the web using state-of-the-art geospatial mapping technology", ASCE World Environmental and Water Resources Congress, Kansas City, Missouri. May 17-21, 2009.

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54. Discovering the spatial and temporal relationships between vegetation condition and climate in monitoring drought", NOAA Climate Prediction Applications Science Workshop, Norman, Oklahoma, March 23-25, 2009.

55. Snowmelt and Rainfall-Runoff Modeling Using NEXRAD Precipitation Input", AGU Fall meeting, San Francisco, California. Dec 15-19, 2008.

56. Climate Impacts on Hydrology in the Central United States: Application to Forecast Capability in the Republican River Basin, Proceeding of World Environmental and Water Resources Congress 2008, ASCE, Honolulu, Hawaii. May 12-16, 2008.

57. Automatic Calibration of HSPF model with NEXRAD rainfall data for Distributed Model Intercomparison Project (DMIP), EOS Trans. AGU, 89(23), Joint Assembly, Fort Lauderdale, Florida. May 27-30, 2008.

58. Identifying time-lag relationships between vegetation condition and climate to produce Vegetation Outlook maps and monitor drought", Proceeding of the 88th American Meteorological Society Annual Meeting, New Orleans, LA. 2008

59. A GIS Framework for Climate Change Studies in Nebraska", Proceedings of the 7th International IWA Symposium on Systems Analysis and Integrated Assessment in Water Management, IWA, Washington, D.C. (http://www.watermatex2007.org). May 7-9, 2007.

60. El Niño-Southern Oscillation (ENSO) and Hydrologic Drought in the United States, 2007 Nebraska GIS Symposium, Qwest Center, Omaha, Nebraska (http://www.symposium2007.org). April 3-5, 2007.

61. Mid-Range Streamflow Prediction Using A Dynamic Climate Model", AWRA 2006 Summer Specialty Conference, Missoula, MT, USA

62. Climate Based Streamflow Forecasts for Water Resource Managers", AWRA 2006 Summer Specialty Conference, Missoula, MT, USA

63. Drought Definitions and Forecasts for Water Resources Management", EWRI Congress 2004, ASCE, Salt Lake City, USA

64. An Optimization Model to Mitigate Conflicts", EWRI Congress 2003, ASCE, Philadelphia, USA

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65. Development of Shared Vision Model for the Optimal Reservoir Operation, International Conference on Hydrology and Water Resources in Asia Pacific Region(APHW), Kyoto, Japan. 2003

66. An Application of Water Conflict Resolution in the Kum River Basin, Korea, EWRI, 2002 Conference on Water Resources Planning and Management, Roanoke, VA, 2002

MEDIA OUTLETS

1. KIVITV. (2019). University of Idaho hosts summer drone camp for kids in Boise, from https://www.kivitv.com/news/university-of-idaho-hosts-summer-drone-camp-for-kids-in-boise

2. Capital Press. (2019). Western Innovator: Drones become flying crop sensors, from https://www.capitalpress.com/ag_sectors/research/western-innovator-drones-become-flying-crop-sensors/article_de36e4c4-d02b-11e9-b5f6-3b9d1ec96e59.html

3. Idaho News. (2018). https://idahonews.com/features/stem-in-idaho/photos-drone-workshops-highlight-possible-stem-careers-for-students

4. KBOI. (2018). Watch: U of I professor teaches drone workshop, from https://idahonews.com/features/stem-in-idaho/watchuofiprofessorteachesdrone101workshop

GRANAT AND PROPOSALS

University of Idaho:

1.Humes, K., Coats, E., McDonald, A., Feris, K., Delparte, D. “The water/energy nexus and food systems in Idaho and the Pacific Northwest”, 7/1/2018-6/30/2021, Role: Co-PI, $2.1M

2.Ryu, J. “Development of system-wide water management model to mitigate social hydrological issues in a changing climate: Case study for the Namgang Dam Watershed”, 1/1/2019-6/30/2020, $86,000

3.Neufeld, J., Ryu, J., Barbour, J. “UAS-based insect scouting”, 7/1/2019-6/30/2020, Role: Co-PI, $7,500

4.Ryu, J. “CALS course development”, 7/1/2019-6/30/2020, $9,000

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5. Ryu, J. and Neufeld, J. "Acquisition of UAS and sensors to advance drought monitoring and water management for Idaho agriculture", Research Equipment Grant, 6/1/2018-6/30/2019, Role: PI, $42,960

6. Ryu, J and LaPagalia, K. "Idaho Drone League (iDrone) to promote STEM education in Idaho", Vandal Idea Project (VIP), University of Idaho, 7/1/2017-6/30/2018. Role: PI, $72,500

7. Ryu, J. "Drought mapping using a small unmanned aerial system (sUAS) for precision agriculture in Idaho, Idaho State Board of Education, 7/1/2016-6/30/2017, Role: PI, $75,000

8. Ryu, J. "Toward advancing drought monitoring and water management for western agriculture using Unmanned Aerial System (UAS)" funded by American Society for Engineering Education (ASEE) and Air Force Summer Faculty Fellowship Program (SFFP).

9. Ryu, J. "Advancing drought monitoring to promote climate-resilient water management in the west" by USDA Hatch, 7/1/2014-6/30/2019, Role: PI, $68,000

10. Ryu, J. "Enhancing water supply monitoring and forecasting using NASA satellite data products" by NASA Idaho NASA EPSCoR, 6/25/2013-6/24/2014, Role: Co-PI, $25,000

11. "IGERT: Adaptation to change in water resources: Science to inform decision-making across disciplines, cultures, and scales, Collaborators: Jan Boll and many UI faculty, My Role: Faculty Participant, $3M total, FY2012-FY2017

12. "Development of LitteFe Linux Cluster for Big Data Analysis" by NSF Idaho EPSCoR, $13,000, FY2013, My Role: PI,

13. "Validating local droughts to enhance climate-resilient agricultural water management in Idaho" by Office of Research and Economic Development, FY2014 Seed Grant Application Page, 7/1/2013-6/30/2013. Role: PI, University of Idaho, $11,999

14. "Development of integrated management technique and system for non-point source control and reduction" by Korea Rural Research Institute, Seoul, Korea, 5/1/2013-8/31/2014. Role: PI, $8,912

15. "Development of integrated management technique and system for non-point source control and reduction" by Korea Rural Research Institute, Seoul, Korea, 8/31/2013-12/31/2013. Role: PI, $9,225

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16. "Development of integrated management technique and system for non-point source control and reduction" by Korea Rural Research Institute, Seoul, Korea, 3/31/2012-8/31/2013. Role: PI, $8,707

17. "Application of an ecological health assessment for Reclamation managed reservoirs"– Submitted to BOR/S&T Program, Collaborators: Dmitri Vidergar (BOR), Jinwon Seo, 1/1/2013-3/31/2014, My Role: PI, $15,000,

18. "Developing a Conjunctive Water Resources Planning and Management Model for the Eastern Snake River Plain" by USGS 104b grant, 3/1/2012-2/28/2013, Collaborators: John Tracy, My Role: Co-PI, University of Idaho, $15,000 (my budget)

19. "Developing an integrated modeling environment for Idaho's climate change research" by EPSCoR, FY2012, My Role: PI, University of Idaho, $42,733

20. "Developing Seasonal Predictive Capability for Drought Mitigation Decision Support System" by NASA via University of Illinois, 10/1/2010-10/09/2012, Role: PI, University of Idaho, $240,014

21. "Development of a pilot drought information system for national drought disaster reduction" by the Korea National Emergency Reduction, 10/1/2009-9/30/2011, Role: PI, University of Idaho, $13,524

22. "Modeling Hydrologic and Socio-Economic Impacts of Alternative Water Management Responses to Climate Change" by USGS WaterSMART, $169,699, My Role: Co-PI (0.5mo for FY2011, 1mo for FY2012 through in-kind service)

University of Nebraska:

1. Knutson, C., Svoboda, M., Ryu, J.H. (Role: Co-PI), "Development of a drought decision support portal for the Republican River Basin of Nebraska, Colorado, and Kansas" by NOAA/SARP, 8/1/2007-7/31/2009, Role: Co-PI, University of Nebraska, $223,525

PEER-REVIEWING

1. Advances in Water Resources
2. Asia-Pacific Journal of Atmospheric Sciences
3. Bioprocess and Biosystems Engineering
4. Environmental Modeling & Software
5. Geophysical Research Letters, American Geophysics Union (AGU)

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6. Hydrologic Science Journal
7. International Journal of Climatology
8. Journal of the American Water Resources Association
9. Journal of Applied Meteorology and Climatology, American Meteorological Society (AMS)
10. Journal of Environmental Management
11. Journal of Hydrology
12. Journal of Hydrologic Engineering, American Society of Civil Engineers (ASCE)
13. Journal of Hydrometeorology, American Meteorological Society (AMS)
14. Journal of Water Resources Planning and Management, ASCE
15. Korean Society of Civil Engineers
16. Natural Hazards
17. Water Resources Research, American Geophysics Union (AGU)

PROJECT-REVIEWING (PROFESSIONAL ACTIVITIES)

1. NOAA Sea Grant, Alabama-Mississippi FY16
2. Partner University Fund, France, FY16
3. National Environment Research Council, United Kingdom, FY14
4. Korea Institute of Construction and Technology (KICT), R&D Program, FY14
5. Small Business Innovation Research (SBIR), Phase II solicitation, FY10, NOAA
6. Sector Application Research Program (SARP), FY10, NOAA
7. Engineer Research and Development Center (ERDC), FY09, The US Army Corps of Engineers
8. Member, National Integrated Drought Information System (NIDIS), GIS Team, 2006-present